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BIOCHAR

Agricultural applications and benefits for Vietnamese farmers

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WHAT IS BIOCHAR

Biochar is a charcoal-like substance of a high carbon content that's made by burning organic material from agricultural and forestry wastes (also called biomass) in a controlled process called pyrolysis.

In terms of physical attributes, biochar is black, highly porous, lightweight, fine-grained and has a large surface area. It increases microbial activity, water and nutrient retention in soils. It often enables a reduction in fertiliser and chemical use, improves soil health and results in increased crop yields.



© Husk Ventures

The most attractive commercial opportunity for biochar in Vietnam lies in the agricultural sector, as biochar-based soil amendments, to improve soil quality and increase yields. Other potential uses of biochar include water/wastewater treatment applications and as activated carbon.

Currently in Vietnam, low quality rice husk ash is already produced from rudimentary combustion systems and distributed in the market as 'biochar', thereby distorting the biochar market where it is sold at low prices, and has inconsistent and lower impact on yields compared to quality biochar produced by pyrolysis technology.



PPV 300 “Le Viet” at a Vietnamese Farmers’ Cooperative

In contrast, biochar from scientifically designed and controlled pyrolysis systems such as the PPV300 (shown above) has the following key properties:

- High carbon content, low ash content
- concentration of environmental pollutants (heavy metals, PAHs, PCBs, etc.) within regulatory limits

‘The existing level of awareness in Vietnam of the benefits of biochar for agriculture make its adoption and market integration easy’

The quality of biochar is regulated by various international standards that specify minimum requirements to qualify as a soil amendment

BIOCHAR Products in Agricultural Applications

Biochar application to soil has several benefits: improved moisture retention, increased root growth, increased fertilizer efficiency, increased microbial activity and overall improved yields and farm productivity

SOIL CONDITIONERS

Biochar, from the pyrolyser with no additional processing, can be sold to be mixed with additional nutrients and used as a soil conditioner. It is a proven soil conditioner - used in agriculture for centuries in many parts of the world as an intrinsic additional component of soil organic matter, found to make up as much as 30% of the organic matter of fertile soil.

BIOFERTILIZERS

Ready to use blends of biochar and other nutrients, typically with a 20-40% content of biochar. These have the benefit of providing added benefits to soil and crops such as additional nutrients or organic matter, depending on the blends considered (e.g. blend with chemical fertilizer or blend with compost).

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Biochar presents an opportunity to improve soil health and can be integrated into all farming practices. Biochar use is compliant with organic certification.

Agricultural applications of other PYROLYSIS BY-PRODUCTS

BIOPESTICIDES: Wood vinegar used as an insect repellent

The dark liquid generated during pyrolysis or the fractionated volatile gases of the pyrolysis process is a 'vinegar' that performs well as a biopesticide



© Husk Ventures

The wood vinegar biopesticide repels insect pests of vegetable, fruit and nut crops and hence can contribute to lowering chemical pesticide use and expenditure for farmers.

Wood vinegar is a natural product, safe for application up until the day of harvest and so is particularly attractive to farmers aiming to acquire international or organic agricultural certifications, allowing them to access higher retail prices and export markets.

Wood vinegar has been shown to be an effective insect repellent when applied at a dilution rate of 1:200.

Wood vinegar being used as a natural insect repellent on cherry tomatoes as a replacement to chemical pesticides at an organic vegetable farm

USEFUL LINKS

Manufacturer of PPV300 pyrolysis machine in Vietnam

Viet Hien Mechanical Co. www.viethien.vn

Biochar Producer, expert on biochar formulations and markets

Husk Ventures, www.huskventures.com

General information on project and activities

Vietnam Cleaner Production Centre, VNCPC, www.vncpc.org

YouTube Development of the Prototype:

[From Waste to Energy: New Perspectives for the Coffee Sector using Pyrolysis Technology](#)

YouTube Technology transfer to Vietnam:

[Pyrolysis and Biochar, a climate smart solution for Vietnam's coffee sector](#)

BIOCHAR Commercial Opportunities

ORGANIC FARMING

Biochar can be integrated into organic farming practices. The Ministry of Agriculture and Rural Development (MARD) in Vietnam has developed policies to promote organic agriculture which will provide a framework for biochar usage and increased demand for inputs for organic fertilizers.



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FARM INPUTS OF INTERNATIONAL AGRICULTURAL STANDARDS

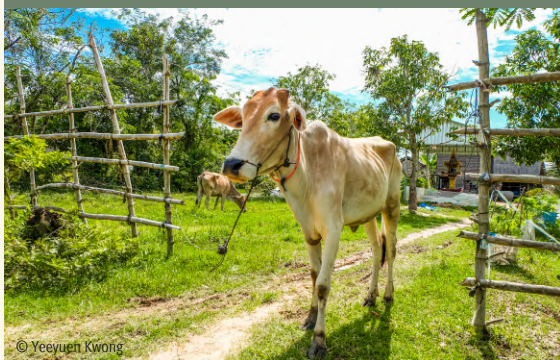
There is a growing supply and demand for organic agricultural inputs and mechanisms such as the Participatory Guarantee System (PGS) and EU Good Agricultural Practices (GAP) certification. These provide potential market entry points for biochar as a complementary input for sustainable agriculture.



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ANIMAL FEED SUPPLEMENT

Biochar has been shown to improve animal health when added to their feed, reduce antibiotic use in animals and improve pasture quality. Biochar is added to animal feed at a 1% rate or at about 1g/kg of animal weight. There is a growing market for biochar as an animal feed supplement in Europe.



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